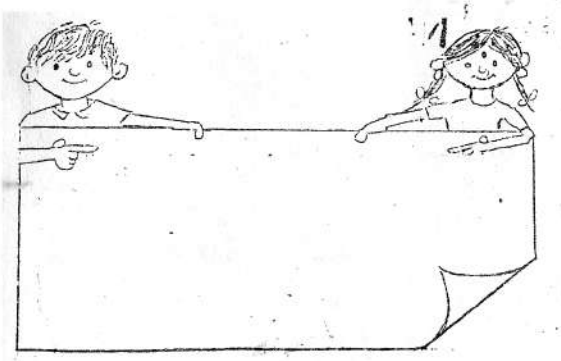
SCIENCE

3

Shankar
Sathyalayam school.

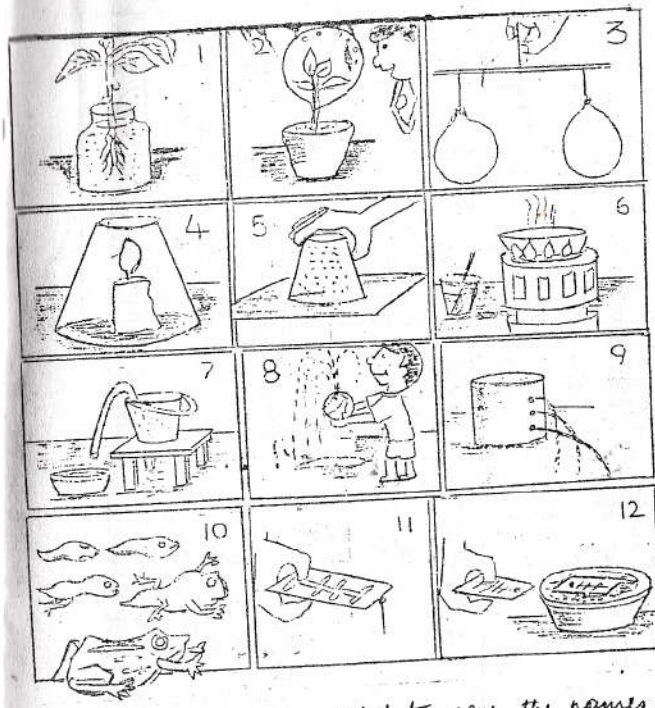
CONTENTS

1.	Plants	4
2.	Air	16
3.	Water	22
4.	Animals	35
5.	Magnetism & Electricity.	44
6.	Simple machines	53
7.	Light	61
8.	Sound	66
9.	Measurements	70
10.	Teacher's notes	74



REVISION

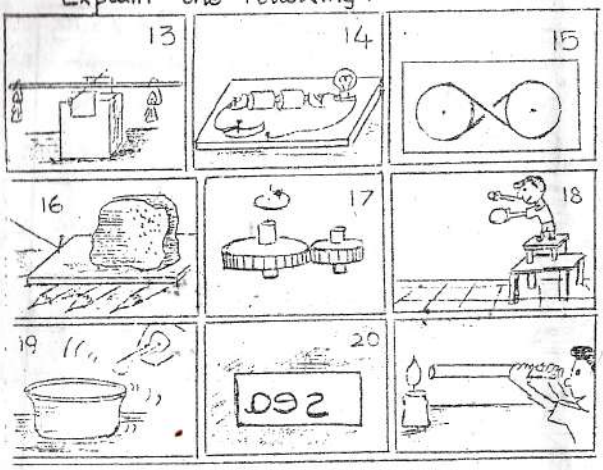
Give explanations for the following :-



The children are expected to say the names of the above experiments done for each picture and explain the inferences arrived at for each. If they have forgotten then the expts must be demonstrated again.

2 REVISION

Explain the following :-



Match :-

frog	switch
magnet	vibrations
electricity	metamorphosis
air	attraction
sound	burning

4

PLANTS

Plants — our food.

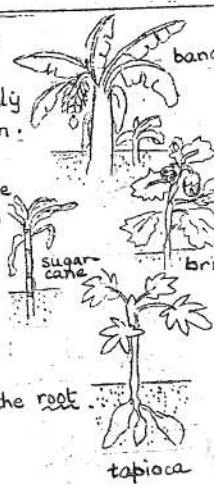
We use many plants, as our food.

In some plants only the fruits can be eaten. (papaya, mango).

In some plants we eat the raw fruits which we call vegetables. (lady's finger, brinjal)

In some plants the leaf is the edible part. (spinach, cabbage)

In some other plants, the edible part is the root. (carrot, beetroot).

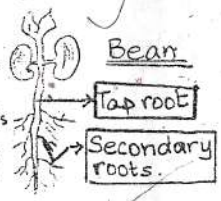


TYPES OF ROOTS

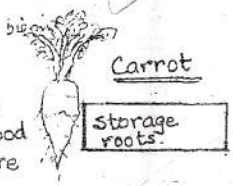
Pull out different kinds of plants with their roots. Wash the roots clean and observe how they are formed.

You will notice that the roots of some plants are fibrous in nature. They are formed as a bunch, from the base of the stem. These are called **fibrous roots**

Some plants have roots which go straight down as a single root, tapering slowly as it goes deeper. This is called a **tap root**. Many small roots branch out from this main root. These are called **secondary roots**.



Some plants have roots that grow thick and fleshy. These plants store their food in their roots. So, these are called **storage roots**.



Now, note the kind of roots you have plucked and classify them in a tabular form in your note-book.

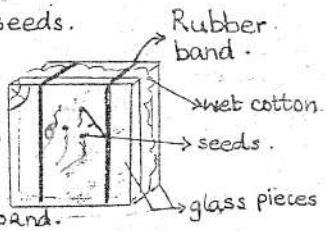
Fibrous roots	Taproot	Storage roots

Take a few mustard seeds.

Place on a piece of wet cotton.

Now keep this piece of cotton between two pieces of glass.

Hold the glass pieces together with a rubber-band.

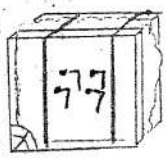


The seeds will now germinate in a day or two.

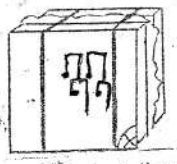
Note the direction in which the roots grow.

Now turn the glass-pieces and observe for another day or two. (Note the corner marked by to remember the first position in the experiment). Note the direction of growth of the roots.

Now turn the glass pieces again and observe the direction of growth after one day.



Write down what you have learnt from this experiment, about the direction of growth of the roots.



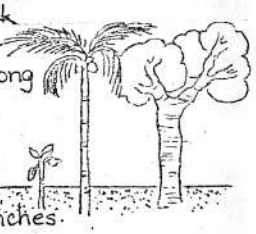
(It is important to mark one corner, as soon as you start the experiment).

A plastic cover can be used instead of glass sheets.

KINDS OF STEMS

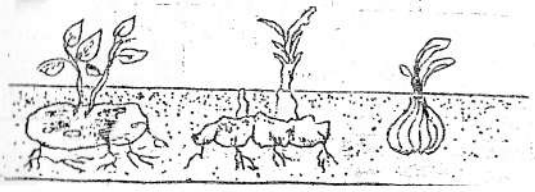
Different plants have different kinds of stems.

Some plants have thick stout stems called the **trunk**. They are strong and erect as in **trees**. **Shrubs** have firm stems. Both trees and shrubs have stems that hold many branches.

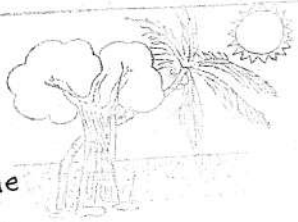


Some plants have weak stems that do not stand erect but creep or spread over some support, (e.g. pumpkin, pepper) These are called **creepers** or **climbers**.

In certain other plants, the stem grows under the ground and grows thick as the food gets stored in it. (e.g. potato, ginger) onion

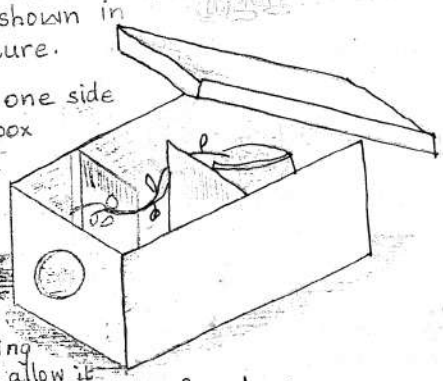


SUNLIGHT AND THE STEM



Take a cardboard box.

Using pieces of cardboard make partitions inside the box, as shown in the picture.



On one side of the box make a round hole, for a window. Take a small, fast-growing plant, and allow it to grow in a pot for a few days.

Then place the pot with the plant, in one corner of the box; close the box, and keep the box near a window.

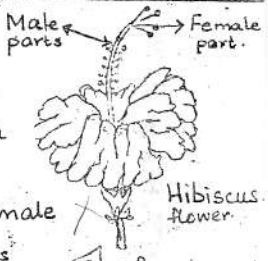
After a few days, note the growth of the plants. What do you see?

Show and discuss, plants or trees which can be seen growing in the direction of sunlight.

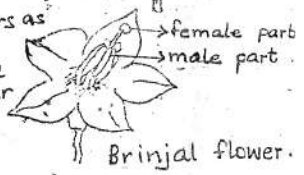
10 FROM FLOWERS TO FRUITS

(Pollination)

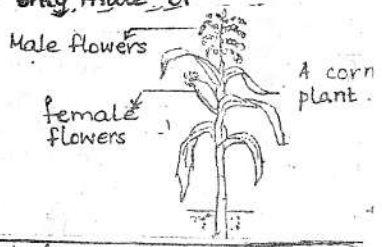
In the previous class we studied the parts of a flower. We also learnt that there is a female part and a male part in a flower. The pollen grains form the male parts.



In some flowers as in the Hibiscus, or the Brinjal, both the male and female parts occur in the same flower.



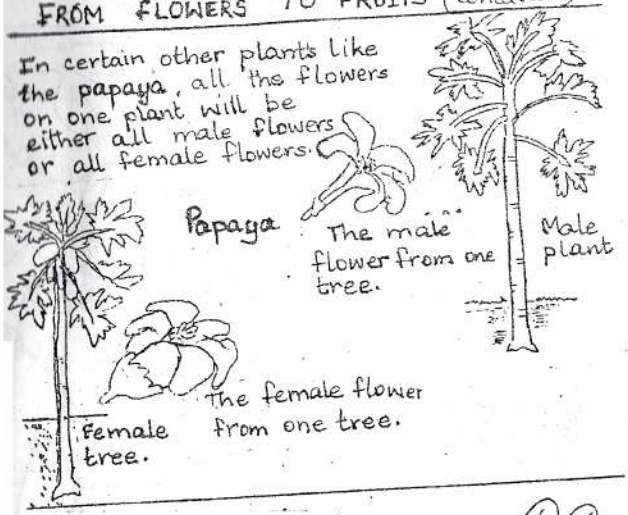
In some plants, as in the **corn**, there are a bunch of flowers on each stalk. Each of these flowers is either **only male** or **only female.**



Collect flowers of plants which have seeds, and observe their various parts and note in particular how the male/female parts are arranged.

FROM FLOWERS TO FRUITS (Contd.....) 11

In certain other plants like the **papaya**, all the flowers on one plant will be either all male flowers or all female flowers.



Insects such as the bee or butterfly come to a flower to suck honey.

Then the powder-like pollen grains (male part) stick to the legs of the insect.

These insects, then go to another flower to suck the

honey. The pollen is now transferred onto the sticky stigma of the second flower. This transfer of pollen from one flower to the stigma (female part) of another flower, is called **pollination**. After the flower is pollinated it dries and slowly transforms into a fruit; with seeds.

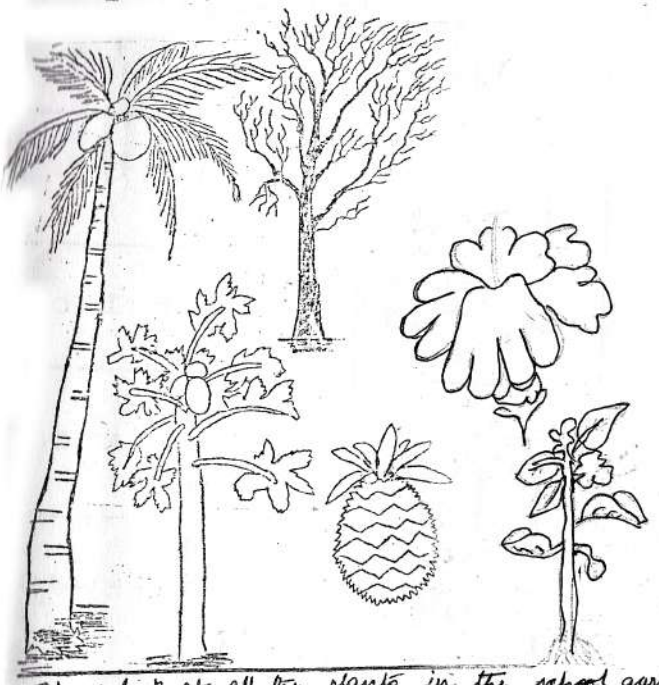
Sometimes the pollen grains are carried by the wind to pollinate the flowers. This is then called 'wind pollination'.

When the pollen of one flower sticks to the stigma of the same flower it is called **self-pollination**.

When the pollen of one flower is transferred to the stigma of another flower, it is called **cross-pollination**.

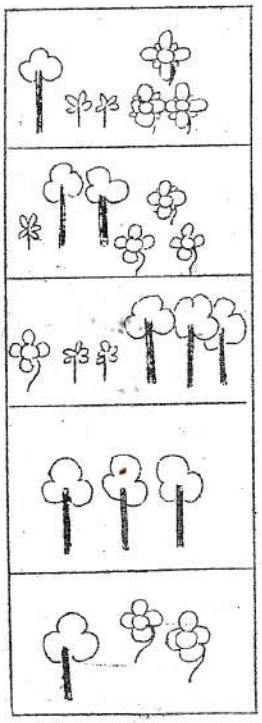
DRAWING

Trace the outlines of these pictures Then Learn to draw them free hand. Practice several times and finally colour them.



Take a look at all the plants in the school garden and encourage the children to draw the various plants, trees, flowers etc. found there. This is a very important exercise.

14 MATCH (BRAIN TEASERS)



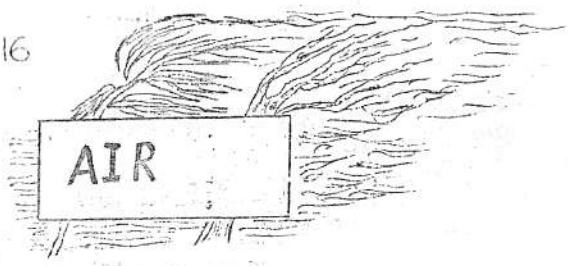
+ + +
+ ○ ○
+ ⊠ ⊠ ○○○
++ ⊠ ○○○
+++ ⊠ ⊠ ○

Let the children work out the symbols and their connections themselves. The teacher only says right or wrong after the exercise has been done. Here again no help must be given by.

CHART. 15

MAKE YOUR OWN FLOWER

Collect pictures of different flowers paste them here and label them neatly.



AIR PRESSURE

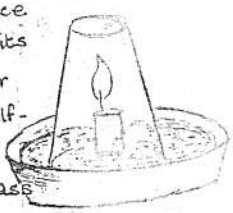
The cardboard kept over a glass filled with water, did not fall when the glass was inverted (done in the previous book).

In that experiment we learnt that air holds the paper up; and so it does not fall down.

Now let us do a few more experiments to understand air pressure better.

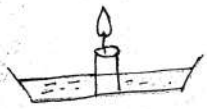
AIR PRESSURE:

Take a plate and place a burning candle in its centre. Now pour water so that the plate is half-filled water.

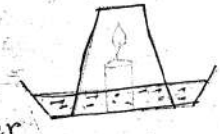


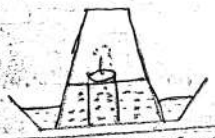
Now invert a glass tumbler over the burning candle. Note what happens. Write down what you notice.

Why was the flame of the candle put out?



Why did the level of water in the glass tumbler rise?

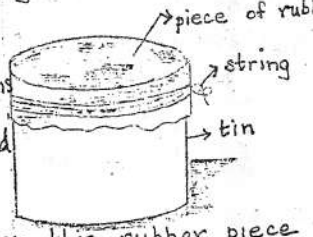




It is essential that the children say and write an explanation clearly and precisely.

AIR PRESSURE

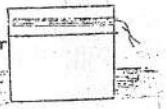
Do the experiment given below and note what happens. (You may ask your teacher to help you).



Take an empty tin (old milk powder tins will do).

Take a balloon and open it up, to stretch it firmly over the mouth of the tin. Keep this rubber piece (balloon) ready for use. Keep a long length string ready.

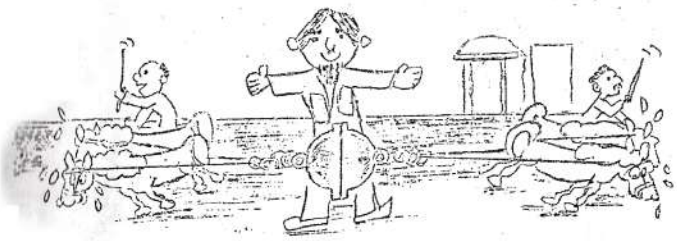
Now burn some scrap paper inside the tin. After the fire dies out and the paper is completely burnt stretch the rubber piece over the mouth of the tin and cover the open mouth completely. Then tie the rubber around the mouth tightly with the string. (Be careful, the tin will be very hot!). Now watch what happens. - Write here what you see.



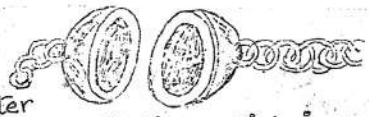
.....

.....

.....



About some 400 hundred years ago a German scientist Otto Von Guericke conducted an experiment to prove that <u>air exerts pressure</u>.

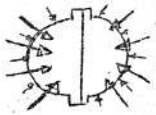


He took two iron hemispheres that fitted exactly into one another. After fitting them together, the air from within was carefully removed. Then iron chains were fixed to both the hemispheres. Even horses could not pull the two hemispheres apart.

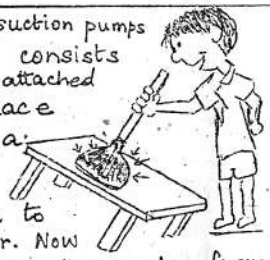
At first he tied four horses onto each side. He found that they could not separate the hemispheres. In fact, he showed that even when sixteen horses were tied to each side the hemispheres could not be separated.

The air pressure on the outer surface of the hemispheres was so great that even sixteen horses on each side couldn't counter that pressure.

Thus ____ showed how great the pressure of air can be.



You may have seen suction pumps to clean kitchen sinks. It consists of a rubber hemisphere attached to a wooden handle. Place the rubber sucker on a stool or a table.



Push the handle to flatten the rubber sucker. Now lift the handle to remove the sucker from the stool.

When air from the rubber sucker was pushed out, outside air pressure pressed the rubber sucker to the stool, so it could not be pulled away from the stool.

Blocks in kitchen sinks are removed using this principle. (with this suction pump).

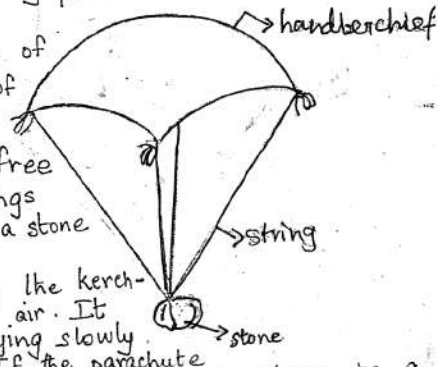
TO MAKE A SIMPLE 'PARACHUTE'

When there is a fire or some engine trouble while an aeroplane is in flight, then passengers use a parachute to escape and save themselves.

A parachute is tied to a person's waist before jumping off the plane. It is like a huge umbrella which spreads open and descends very slowly. This is how people can be rescued.

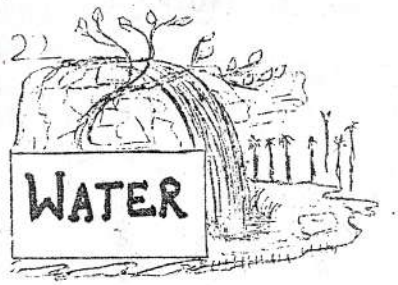
Take a big piece of cloth or a big handkerchief.

Tie a piece of string to each of its corners.



Bring the free ends of the strings together and tie a stone over there.

Now fling the kerchief high into the air. It comes down swaying slowly through the air. If the parachute does not fall well, try changing the stone to a smaller one and see how it works.



a tumbler of water in the tin. Dissolve roughly 5 spoons of salt in it.

Close the tin firmly and place it on a stove. Heat the salt solution. Collect the water droplets that come out through the straw into a glass. Taste some of that water. Is it salty?

.....

What happens to the salt that was dissolved

.....

This process of getting pure water from salt water is called 'Distillation'.

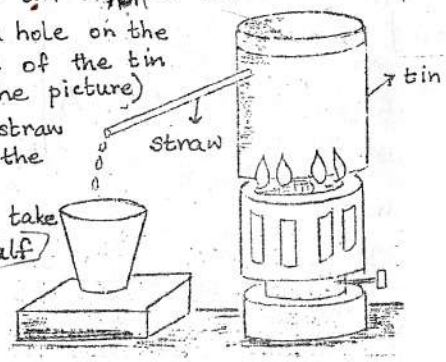
Separating water from salt solution

Take a tin with its lid.

Make a hole on the surface of the tin (as in the picture)

Put a straw through the hole.

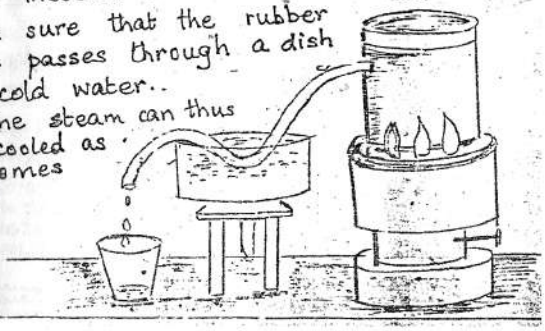
Now take about half



Repeat the above process using a rubber tube instead of a straw.

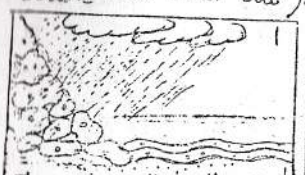
Make sure that the rubber tube passes through a dish of cold water..

The steam can thus be cooled as it comes out.

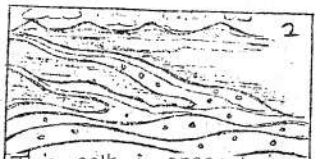


WHY IS SEA WATER SALTY ?

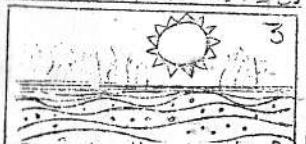
Have you ever tasted sea water ?
Why is it salty ? (Take a look at the pictures below and find out).



There is salt in the mud and in rocks. This salt dissolves when it rains.



This salt is present in rivers, which finally flow into the sea.



Due to the heat of the sun the water evaporates and rises leaving the salt behind.

This water vapour rises to form clouds. When the clouds are sufficiently cooled, it rains.

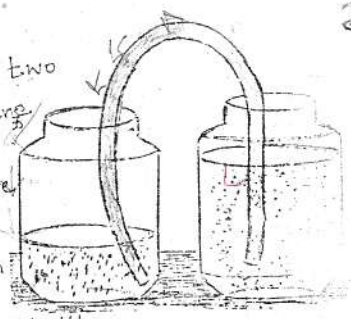
Again, the salt in the rocks and in the mud dissolves and is carried by rivers into the sea. Here, again only the water evaporates due to the heat of the sun, leaving this salt too, behind, at the bottom.

In this manner the salt from the rocks reached the sea, a process that started more than a million years ago. Each time, only the salt would be left behind while the water evaporated from the sea. Thus, the amount of salt in the sea grew steadily, and sea water tastes salty today.

Explain clearly why sea water is salty.

Make the children read these boxes many times, so that they understand well. Explain the link between the experiment on pg 22 and this process here.

The Siphon



Take water in two bottles. Take care to see that the levels of water are not the same.

Place a siphon (with one end in each bottle) in the bottles.

Suck out the air from the siphon and observe the water passing from one bottle into another.

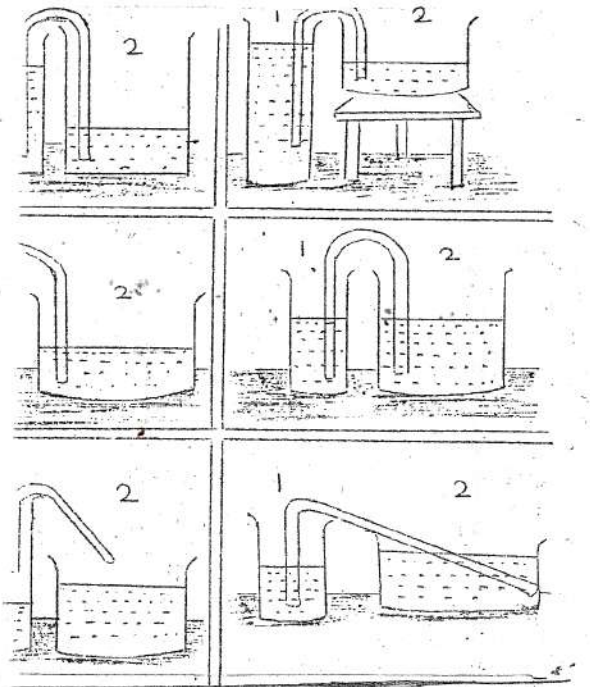
What did you observe?
(Tick the right answer).

1. Water keeps flowing until one of the bottles get empty — ☐
2. Water keeps flowing till the water levels in the bottles become equal — ☐
3. Water flows from the bottle which has a lower level to the bottle which has a higher level of water — ☑

Write your observations here.

The Siphon.....

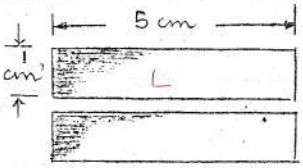
of the drawings below indicate with an direction in which you think the water



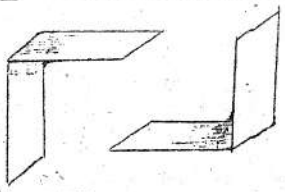
wildren to give the answers orally before
n the arrows. wherever they are not
e direction of flow, set-up the siphon and
picture and let them observe before giving

MAKE A WATER WHEEL.

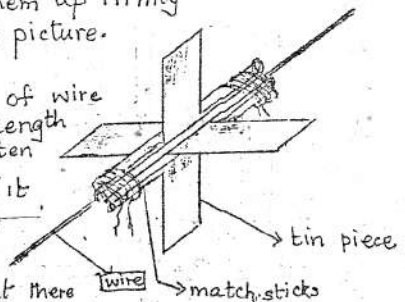
Cut out two tin pieces, each 5cm long and 1cm broad.



Fold them both into an 'L' shape.

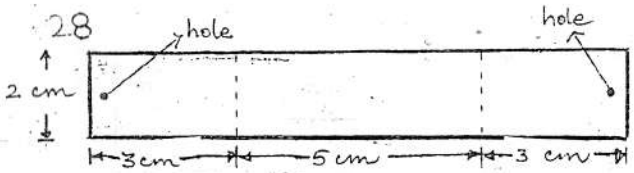


Take four matchsticks. Keep the matchsticks in the folds of the tin pieces and tie them up firmly as shown in this picture.



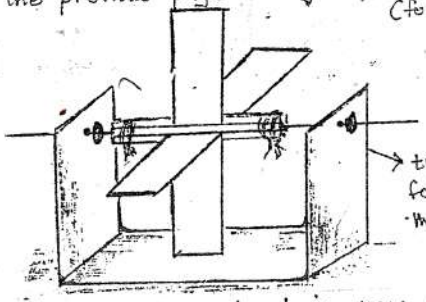
Take a piece of wire (GI wire will do) of length 12cm and straighten it out. Now place it securely between the matchsticks in such a way that there is 3cm on both sides extending outside the edge of the sticks. (as in the picture).

2.8

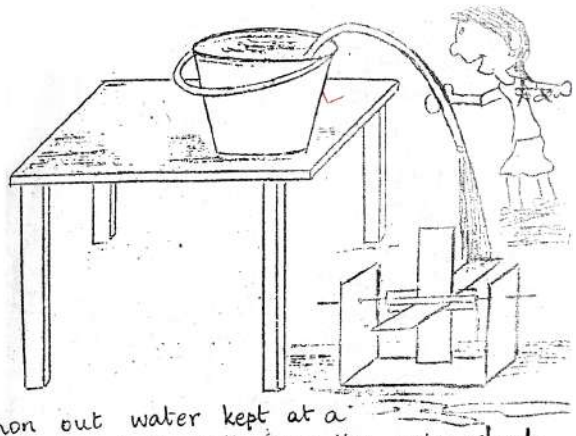


Cut out one more tin piece of length 11 cm and breadth 2cm. Make 2 small holes on either side with a small nail (as in the picture). At a distance of 3 cm from either end fold the tin piece at a right angle (along the dotted lines as shown).

Pass the wire of the wheel made from the previous page through the holes. (follow this picture)

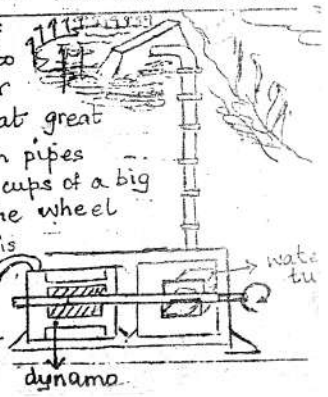


The water wheel is now ready. Blow over the blades. The water wheel should spin freely with great speed.



Siphon out water kept at a height and make it fall over the water wheel. Now the water wheel spins with the force of wat

The water wheel is used in power stations to produce electricity. Water stored in huge reservoirs at great heights is brought down in pipes and made to fall over the cups of a big water wheel (turbine). The wheel spins at a great speed. This in turn makes the dynamo to which it is attached spin. (dynamo, as in cycles) When the dynamo turns, it produces electricity.



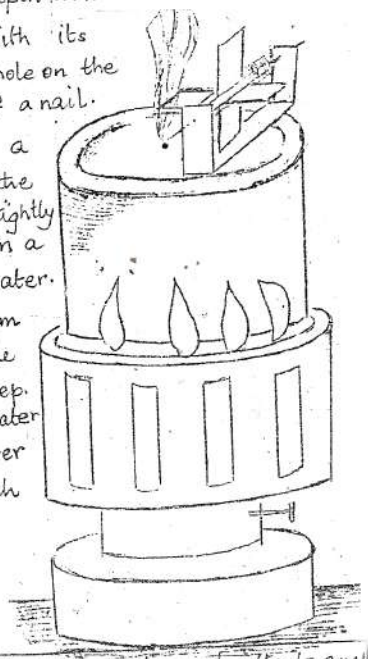
MAKE A STEAM ENGINE.

We have already made an engine that works with force of water. Now the same engine can be made to spin with the force of steam.

Take a tin with its lid. Make a small hole on the lid with the help of a nail.

Pour about ½ a glass of water into the tin. Close the tin tightly and keep the tin on a stove to boil the water.

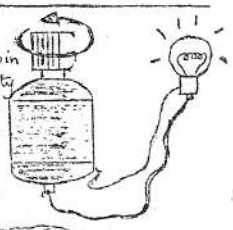
Soon the steam will out through the hole on the lid. Keep the blades of the water engine, just made over the steam and watch it spin.

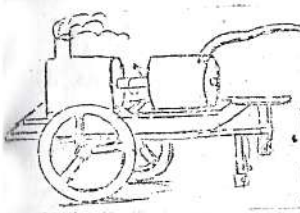


Only if the water wheel spins freely and without any too unnecessary shaking or friction will it spin easily and fast with the force of steam.

HOW ELECTRICITY IS GENERATED.

Have you observed a cycle dynamo carefully? You will notice that the main shaft is made to spin very fast. When that happens electricity is produced. This electricity passes through the electrical wires to make the cycle bulb burn.





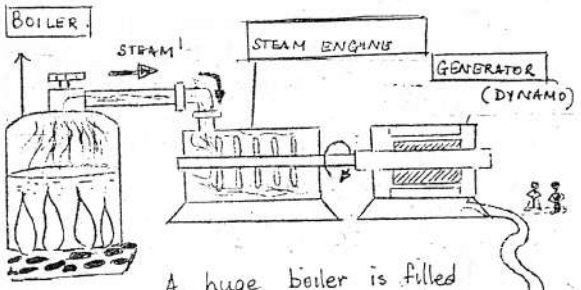
During festivals you may have observed a big, noisy, 'generator' being used to light up the small bulbs used for decoration.

This generator has a diesel engine attached to it. The diesel engine makes the main shaft of the generator revolve at a great speed. Then electricity is produced. The 'dynamo' and the 'generator' are machines with a similar structure. When their shafts spin they produce electricity.

The electricity that we use in our homes is also produced by a very big generator. It's shaft is made to revolve with the use of water pressure or the pressure of steam. When the shaft spins, electricity is produced.

The main principle behind how electricity is produced has been explained in a very simple manner here, so the children understand it easily. The details of this may be explained

HOW STEAM IS USED TO GENERATE ELECTRICITY.



A huge boiler is filled with water. When the water boils the steam rises up.

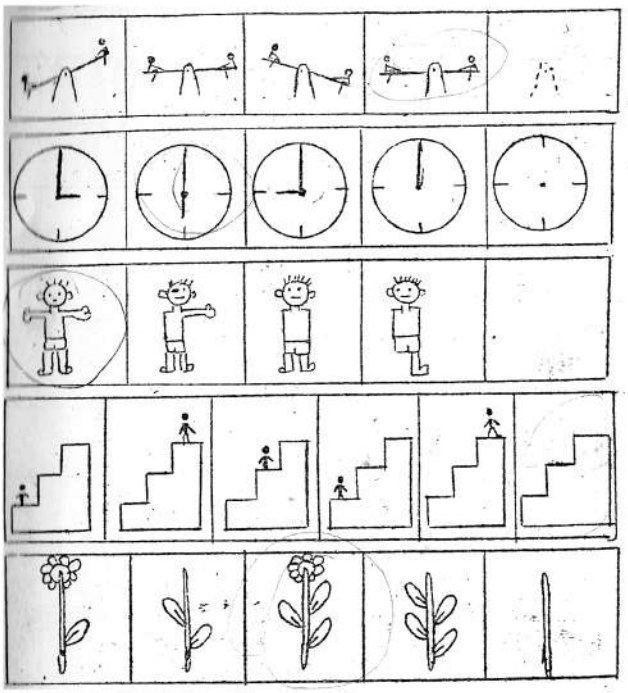
This steam is used to make the blades of a steam engine revolve at a great speed. The steam engine is fixed to the shaft of a generator. So, when the steam engine spin it makes the shaft of the generator also spin. This, then produces electricity.

This electricity is brought to our homes using electrical wires.

discuss how electricity could be generated using either water or steam, whether the steam engine made by you here could be set up to really produce electricity. Show and explain the structure and function of a dynamo in a simple manner. Show, also (if possible) the working of a generator. When the opportunity arises, use it to make a trip to a power station close by.

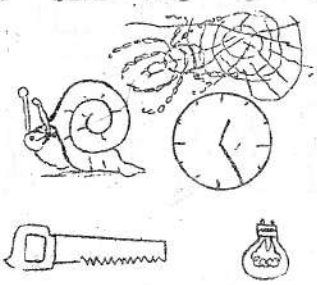
WHAT COMES NEXT ?

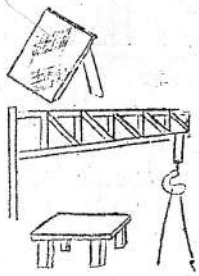
Draw what comes next in the last column:

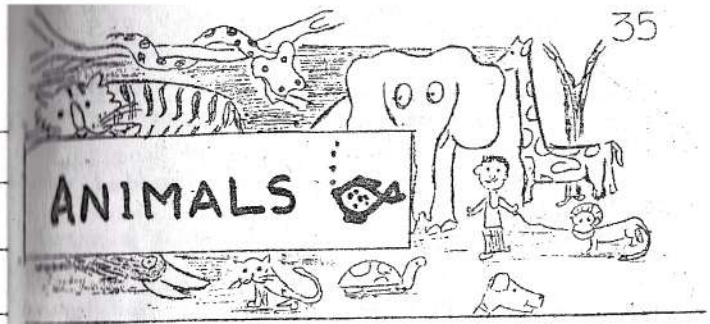


34 WHAT IS IT?

1. Has teeth but does not bite, What is it ?
2. Has legs but cannot run, What is it ?
3. Iron hands with no fingers, and yet can lift anything. What is it ?
4. Has no feet ; but can go round and round several times. What is it?
5. Sits all day long in it's roofless house. What is it ?
6. My home is my back ; my back is my home . Who am I ?
7. You need no oil, you need no match stick but you can make me burn. What am I?
8. It laughs when you laugh; it cries when you cry. What is it .

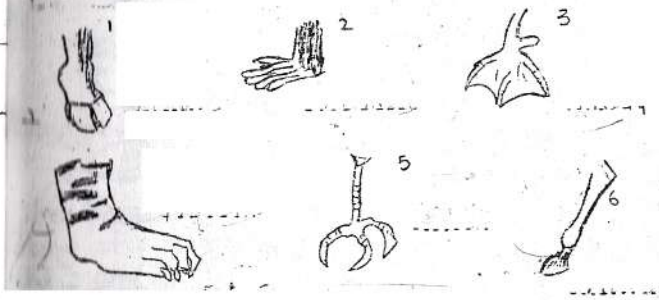






The External features of animals.

Whose feet are these? Write the name of the animal to which it belongs. Give reasons as to why they have such feet.



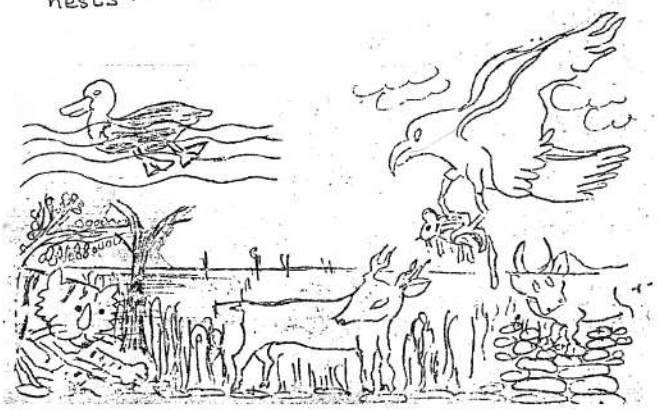
monkey	cow	horse	eagle	tiger	duck

In animals such as cows and horses the **hoofed feet** are suited for running fast, even over stony paths and uneven ground.

Animals belonging to the cat family like tigers etc., have very special **padded feet**. These help when hunting, as they can move noiselessly to catch their prey.

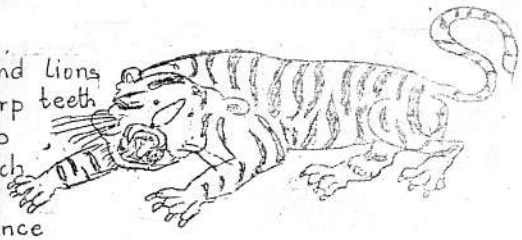
Animals like ducks, frogs etc. have **webbed feet**. These act as paddles when they move in the water. They are also useful for walking on land.

Birds that feed on smaller animals have **clawed feet** that have long, sharp and curved nails. These help to grip the animal firmly as they fly away to their nests.

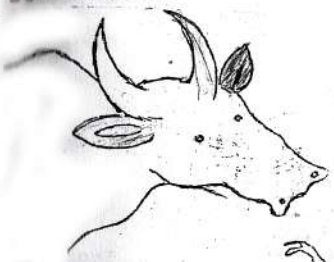


ORGANS OF SELF-DEFENCE

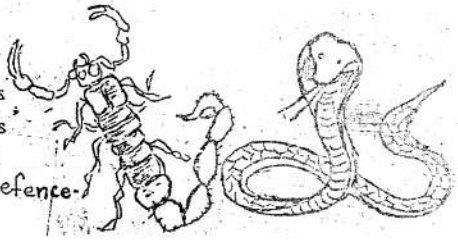
Different kinds of animals have different ways of defending themselves against their enemies.



Tigers and lions have sharp teeth and sharp claws which help in self-defence



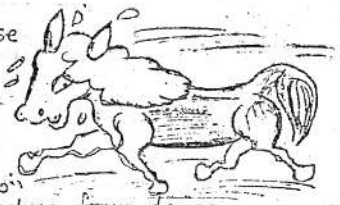
Cows and goats use their sharp horns to defend themselves against their enemies.



The poisonous sting of snakes and scorpions is a very effective means of self-defence.

38 : SELF-DEFENCE....

The deer and horse run when in danger. Their slender, sleek body shape helps them gain speed while running, and so protect themselves from danger.

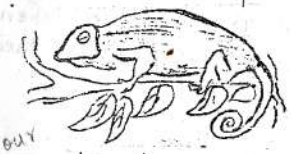


Mention the organs of self-defence in each of the animals given below.

porcupine Spikes

tortoise shell

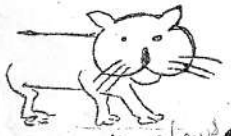
centipede



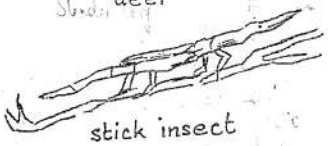
chameleon colour

deer

snail



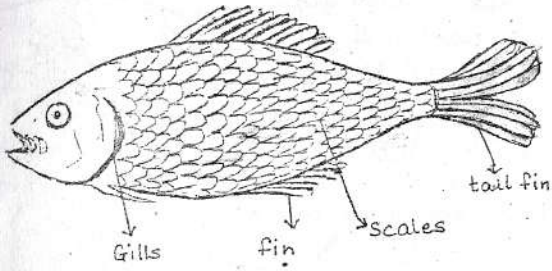
cat claws



stick insect

man

FISH – External features 39



Keep some live fish in a fish-tank, bottle or bucket, in your school and observe it's external features.

Note how it uses it's fins and tail to swim. It's body is covered with scales. This is a protective covering over it's soft body.

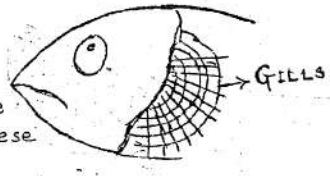
How does a fish breathe?

Have you seen a fish constantly opening and closing it's mouth?

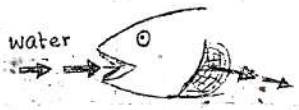
It breathes oxygen that is dissolved in the water.

FISH... EXTERNAL FEATURES.....

Take a dead fish and examine it.



You will see an opening just behind the eyes on both sides. These are the gills. The gills absorb the oxygen that is dissolved in the water.



When the fish opens its mouth the water enters its body and passes through the gills. As the water comes out of the gills, the oxygen dissolved in the water is absorbed by them.

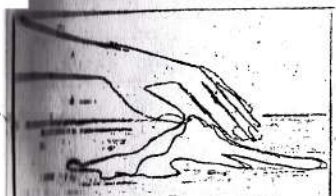
There are many varieties of fish. Try and ask your teacher to show you pictures of, or tell you about some of the interesting varieties. Some of them are the 'bioluminiscent fish', electric ray fish, bullet fish etc. Try and collect pictures of as many kinds of fish as possible.

Keep a fish tank in your class and see how many varieties you can collect.

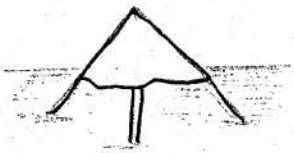
OUR BODY

Touch and feel the various parts of your body. Feel all your bones.

Why do we have bones in our body?



Have you tried to make a piece of cloth stand erect on its own. It crumples and falls to the ground.



You can make the cloth stand firm and upright by placing it over 3 sticks that are tied together at the top.

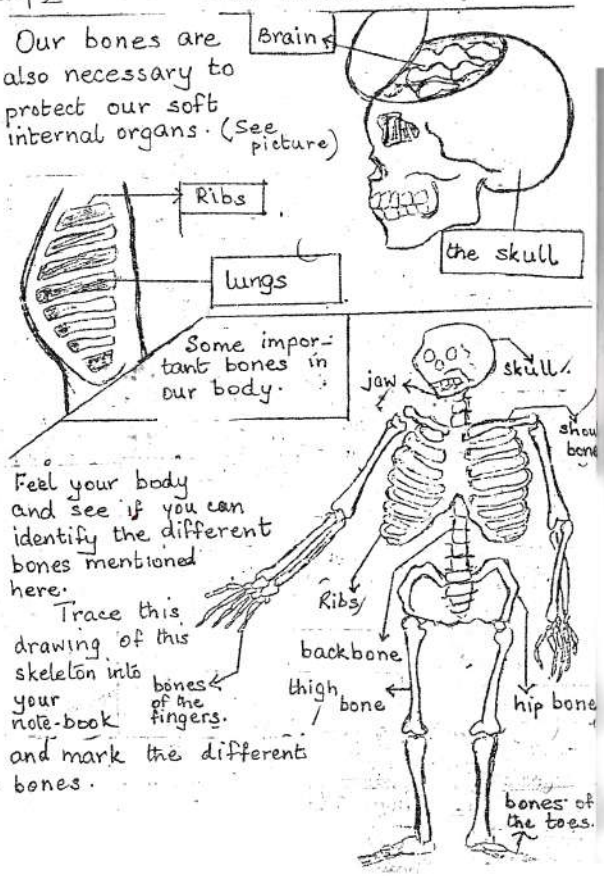
Similarly we need bones to keep our body upright and erect.

Without our bones !?!

We would be like this !!

OUR BONES...

Our bones are also necessary to protect our soft internal organs. (See picture)



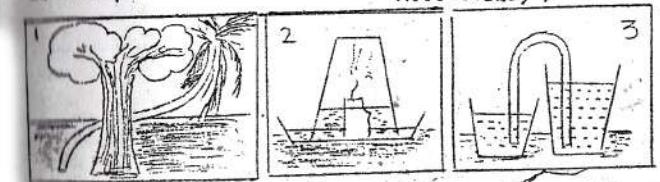
Feel your body and see if you can identify the different bones mentioned here.

Trace this drawing of this skeleton into your note-book and mark the different bones.

Match :-

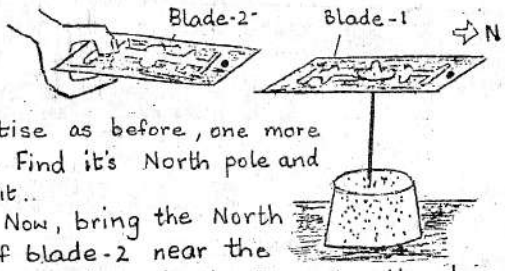
Pressure of steam	Water levels
	Pollination
gills	Air pressure
Siphon	Producing electricity
flower	Organs for breathing in fish.

Give very brief one line explanations for each of the pictures given below. (Write them in your note-books).



What do you see in this picture?
What is it used for?
How does it work?
(Write down your answers in your note-books)

ATTRACTION - REPULSION



Magnetise as before, one more blade. Find it's North pole and mark it.

Now, bring the North pole of blade-2 near the South pole of blade-1. Does it attract or repel? Do as given below and fill in the given tabulation.

Blade-1	Blade-2	Attracts ? Repels ?
South	North	.....
South	South	.....
North	North	.....
North	South	.....

Like poles _____ each other.

Unlike poles _____ each

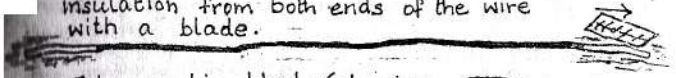
MAKE AN ELECTRO-MAGNET.

We magnetised a blade by rubbing over it with a bar magnet.

Now, we will use electricity to make a magnet.

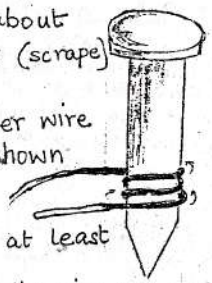
For this you will need a copper-coated copper wire*. Get about ½ a metre of this wire from your teacher.

First scrape off the copper-coated insulation from both ends of the wire with a blade.



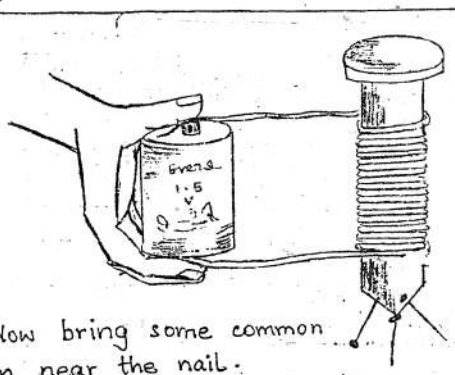
Take a big blade (about 8cm long) and clean out (scrape) any rusted portion.

Now coil this copper wire around the nail (as shown here). The coils must be firm and closely wound. There must be at least 30-50 coils).



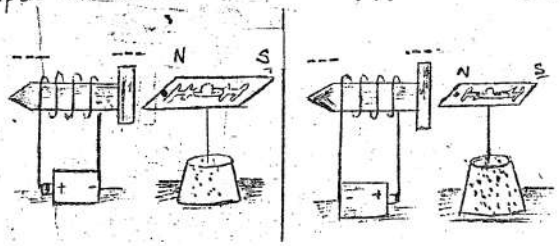
The two ends of the wire are now placed on either end of a battery.

* Copper-coated copper wire is a kind of thin copper wire which is insulated with a kind of copper coloured insulate material. This is available in any electrical shop and t thickness is one of many measurements. Ask for a 24 Gauge o 28 Gauge thick wire. This copper coloured insulation must be scraped off well from both ends before it is used for this experiment.



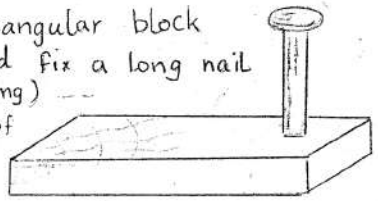
Now bring some common pin near the nail.
Has the nail acquired a magnetic property?

Connect the battery in the directions given below and find the poles of the electro-magnet. Find out if the North pole of the magnetic needle attracts or repels the head of the nail and mark accordingly.

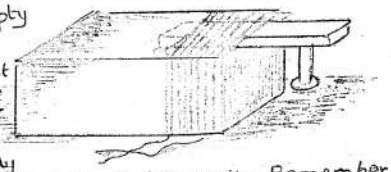


MAKE A MODEL.

Take a rectangular block of wood and fix a long nail (about 5 cm long) to one end of the block.

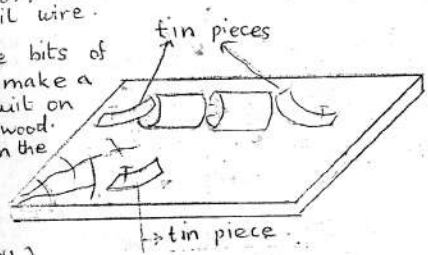


Tie up firmly this block of wood and the base of an empty chalk box. (The head of the nail must be a few inches above the ground).

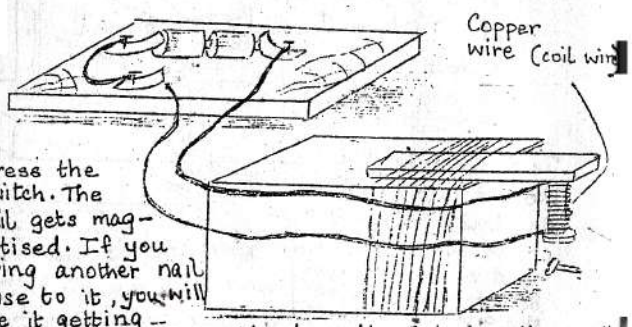


Now coil some copper wire wire tightly and closely around the length of the nail. Remember to scrape off the insulated coating from both the ends of the coil wire.

Using three bits of tin pieces make a switch circuit on a plank of wood. (as you did in the last class)

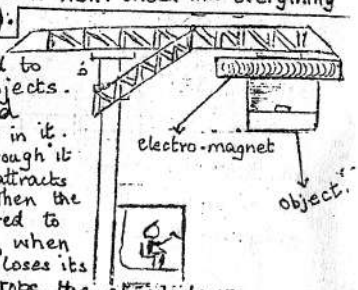


Now connect up all that you have prepared according to the diagram given in the following page.

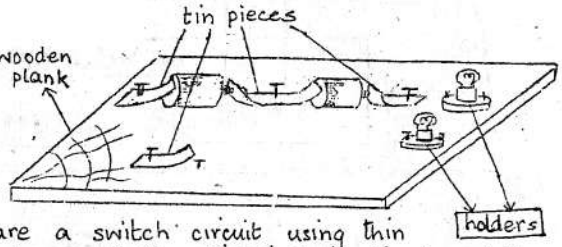


Press the switch. The nail gets magnetised. If you bring another nail close to it, you will see it getting drawn to the magnetised nail. Release the switch and the small nail falls off the electro-magnet. Do this repeatedly and see how your electro-magnet lifts different objects.

(Careful: If the batteries are not connected firmly to the tin pieces (or) if the wires are not attached properly, (or) if the tin pieces have paint or rust on them this model will not work well. Check into everything patiently and carefully).

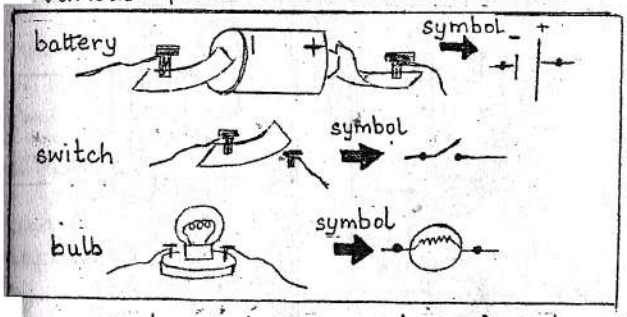


This electro-magnetic crane is used to lift very heavy iron objects. There is a very big and powerful electro-magnet in it. When current passes through it it gets magnetised and attracts iron objects towards it. Then the iron object is transferred to the required place. There, when the current is stopped loses its magnetic property and drops the object down.



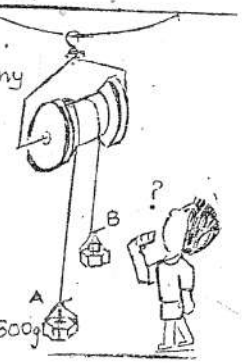
Prepare a switch circuit using thin tin pieces cut to required size. Fix two bulbs into their holders which must be nailed on to the plank.

Now learn these symbols for the various parts of an electrical circuit.



Understand the meaning of each symbol well, and then proceed to the next page. Follow the circuit diagrams given there, and make the appropriate connections.

This is now your pulley. Hang it from a nail or any rope. Pass a thread around the pulley and try lifting different objects.



Now take a 500g. weight and hang it from one end (from end A)

To raise this weight how much weight will you require to hang from the other end (from end B) Try to make a guess and enter it below, then find out the actual weight required

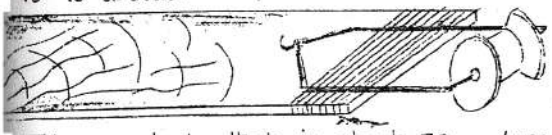
Similarly, guess what the weight will be at end (B) if the given weights (see below) are hung from end A. Later, do the experiment and find out the actual weights

from end (A) weight	from end (B) weight	
	Your guess	Actual weight
500 grams	.....	.....
1000 grams	.....	.....
1500grams	.....	.....

You may have seen a wooden plank being kept inclined, when heavy objects are rolled over the plank to load into lorries

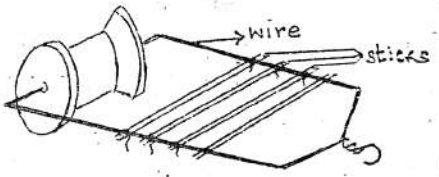
Why do you think the inclined plane (plank) is used?

Let us make an inclined and see how it is useful.

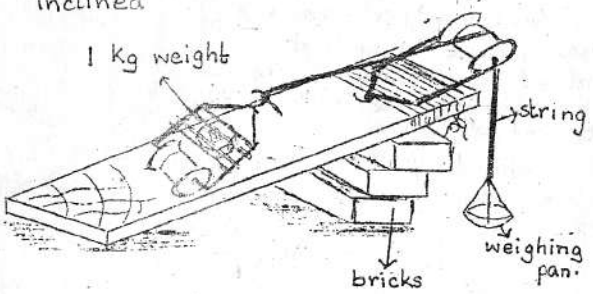


Take a plank that is about 50 cm long and 10 cm broad. Onto one end of the plank tie a simple pulley to it.

Using another spool and some wire prepare a cart-like structure, as shown in this picture.



Use bricks to keep the plank inclined



Tie a string (twine) to the hook of the cart. At the other end of the string tie a weighing pan.

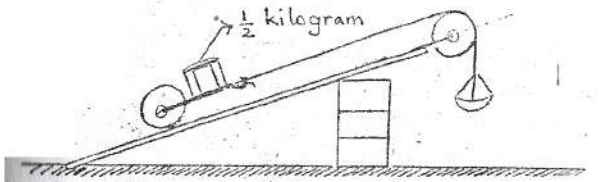
Place a 1 kg weight on the cart-like structure.

A specific weight will be required in the pan, so that the 1 kg weight in the cart can move up on the inclined plane.

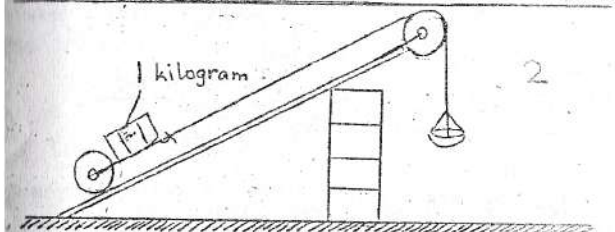
How much weight do you think is needed } _____

Try out different weights
How much did you require : _____

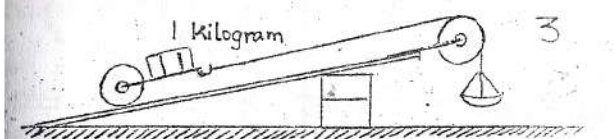
Similarly, try using different weights and heights, as given on the following page and record your observations.



Weight required to pull it up: _____



Weight required to pull it up: _____



Weight required to pull it up: _____

What did you understand from this experiment ?

.....

.....

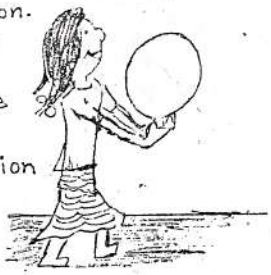
.....

.....

58 IN WHICH DIRECTION WILL IT GO?

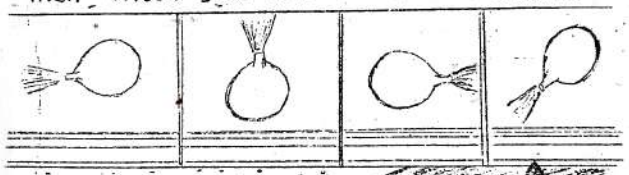
Blow air into a balloon. Hold the balloon with it's mouth facing downwards. Now let the balloon go.

In which direction did it go?



(up, down)

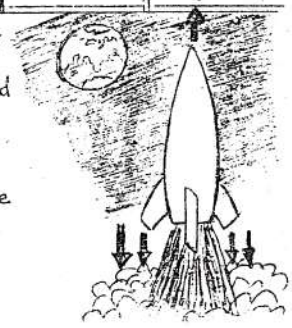
In the pictures below draw arrows to show the direction in which the balloon will go. Then check your answers with a balloon.



Rockets too, fly into space on this principle.

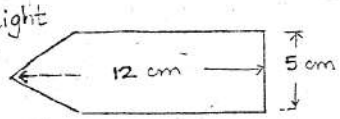
Hot gases are pushed out with a great force from the base of the rocket.

As the hot gases are pushed downwards, the rocket rises upwards.



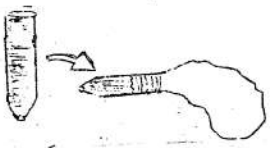
MAKE A 'JET' BOAT.

Take a piece of light wood (as in chalk-boxes).



Cut out the shape according to this picture.

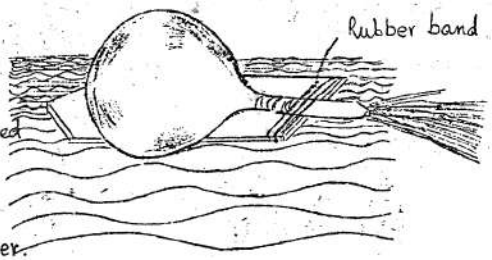
Cut out a piece as in this picture from an old plastic pen.



Fix the pen bit to the mouth of a balloon with a rubber-band, as shown above.

Tie this up on to the plank above, with a rubber-band. (see picture below)

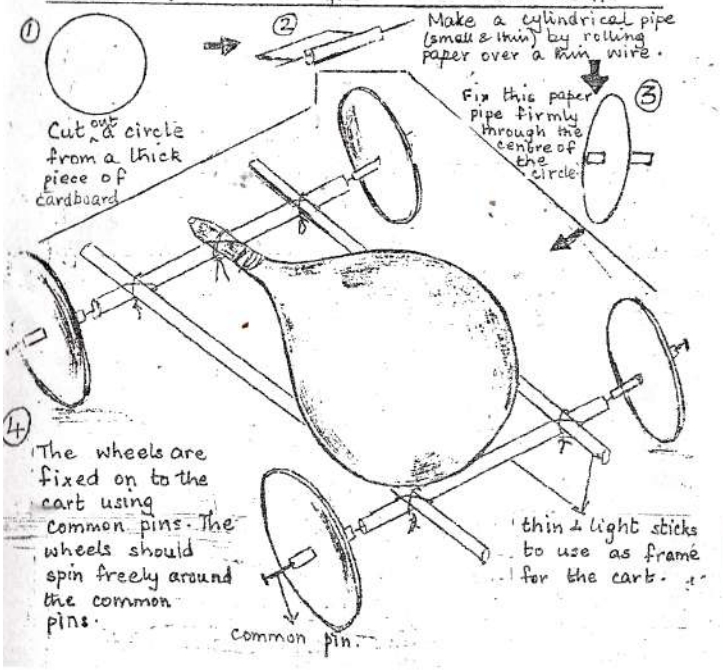
Blow air into the balloon and let your jet boat float on water. Use any big, wide-mouthed container e.g drum, bathtub etc. for the water.

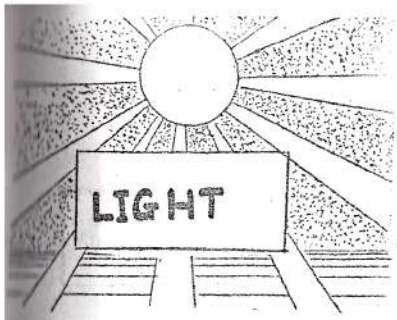


60 MAKE A 'JET' CART.

We have already Learnt how to make cardboard wheels in the last class. (Science-2. pg·57). Make wheels in the same manner and make a cart as given in the picture below.

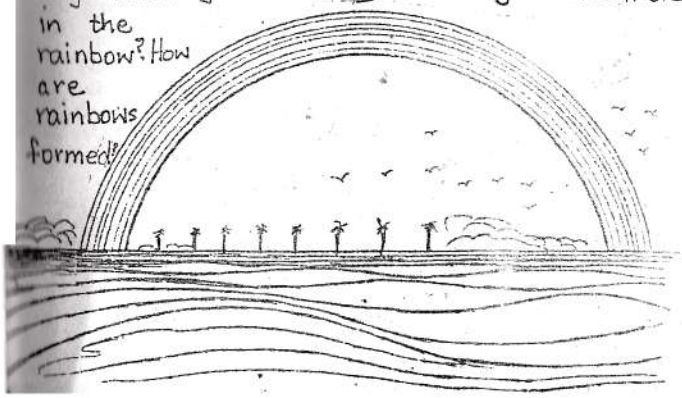
Fix a pen bit (as in jet boat) to the mouth of a balloon. Tie the balloon to the cart. Blow well into the balloon and go. Now watch your cart speed acro s the room.


1
2
Make a cylindrical pipe (small & thin) by rolling paper over a thin wire.
Fix this paper pipe firmly through the centre of the circle
3
Cut out a circle from a thick piece of cardboard
4
The wheels are fixed on to the cart using common pins. The wheels should spin freely around the common pins.
thin & light sticks to use as frame for the cart.
common pin

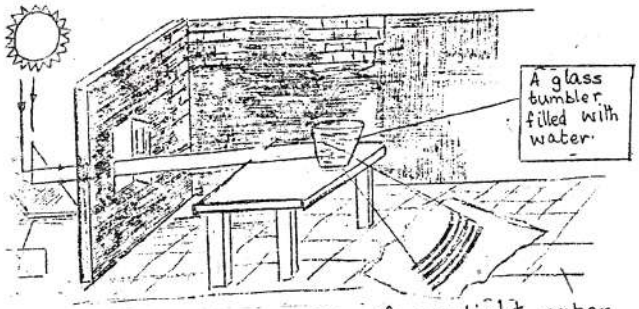


THE RAINBOW

On certain days just after a shower of rai you may have seen a colourful bow across the sky. Have you noticed how many colours there ar in the rainbow? How are rainbows formed?



MAKE A RAINBOW



Let in only a ray of sunlight enter a dark room. (Direct that ray with the help of a mirror).

Place a glass tumbler ofilled with water on a table. Keep the glass carefully in the path of lo that ray.

Place a white sheet of cloth on the floor, so that the rainbow is seen clearly on it. Note the colours you see and write them down here.

.....

.....

.....

THE COLOURS OF SUNLIGHT

Sunlight appears white to us. In fact, there are seven colours contained in that white light. They are :-

1. Violet 2. Indigo 3. Blue 4. Green
5. Yellow 6. Orange 7. Red.

When the ray of sunlight passes through the glass of water, it splits into its seven colours.

Just a little while after it has rained, there will still be some water droplets in the sky. When sunlight passes through these water droplets, it is split into its seven colours, and that's how a rainbow is formed.

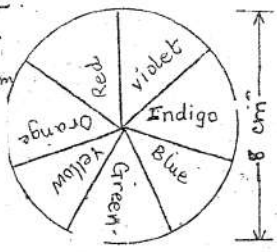
The seven colours contained in sunlight was first discovered about 300 years ago by a scientist called Sir Isaac Newton.

64 THE SEVEN COLOURS TOGETHER.

We have just learnt that white light splits into seven colours. In that case all the seven colours when put together must form a white colour.

Let us see if that happens.....

Take some stiff cardboard. Cut out a circular disc of diameter 8cm from that cardboard. Divide the disc into seven equal parts. Colour each part with one of the seven colours as given in this picture.

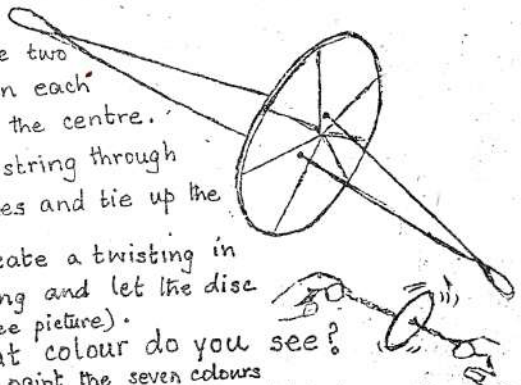


Make two holes on each side of the centre. Pass a string through the holes and tie up the ends.

Create a twisting in the string and let the disc spin (see picture).

What colour do you see?

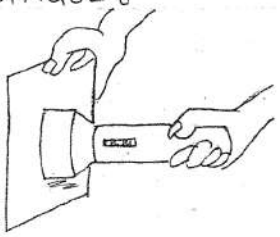
If you paint the seven colours one over the other will you get white colour? Do it and see!!



TRANSPARENT ? OPAQUE ? 65

Keep the following objects in front of a beam of light from a torch.

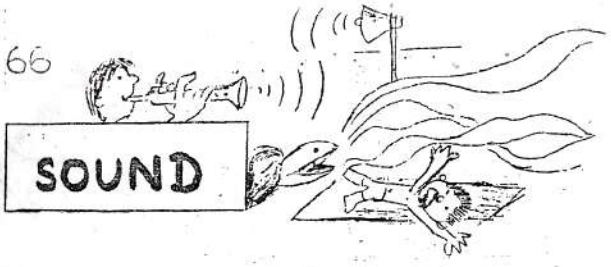
1. Cloth
2. Paper
3. Glass
4. Wooden plank
5. Mirror
6. Plastic
7. Tin
8. Water
9. Buttermilk
10. a broad leaf



Observe the beam of light from the other side of the object. Note carefully what happens to the light and accordingly separate the objects into these 3 categories bel

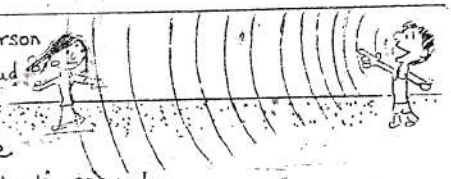
Transparent (light passes)	Opaque (light doesn't pass)	Translucent (a fuzzy light)
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

Explain as the student does the experiment what each of these words mean; make them write these term several times in their note books.



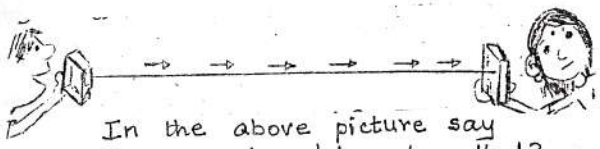
SOUND

HOW SOUND TRAVELS

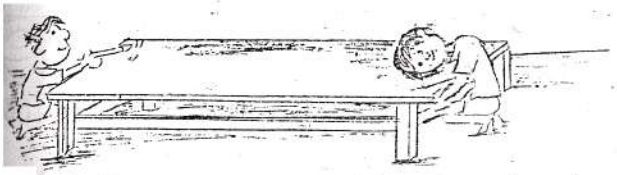


When a person makes a loud sound from a distance, we are able to hear that sound.

Sound travels through the air and reaches our ears.



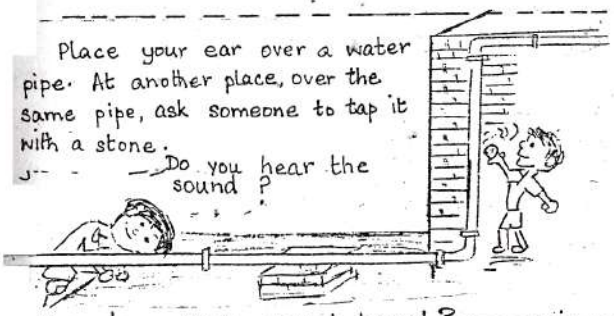
In the above picture say how the sound has travelled?



Place your on one end of a long bench. Ask someone to tap lightly with a pencil on the other end.

Do you hear the sound of the pencil clearly, with your ear to the bench? Do you hear the sound clearly with your ear away from the bench?

In this experiment how did sound travel?



Place your ear over a water pipe. At another place, over the same pipe, ask someone to tap it with a stone.

Do you hear the sound?

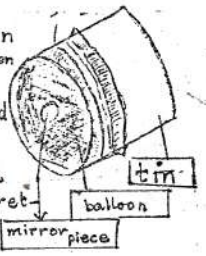
Now how did the sound travel?---

CAN YOU SEE THE VIBRATIONS OF SOUND?

When objects vibrate, they produce sound. We learnt this in the last class.

Now we will try to see these vibrations.

Take a small, empty tin. Cut out the bottom of this tin carefully. (Now the tin is open on both sides).



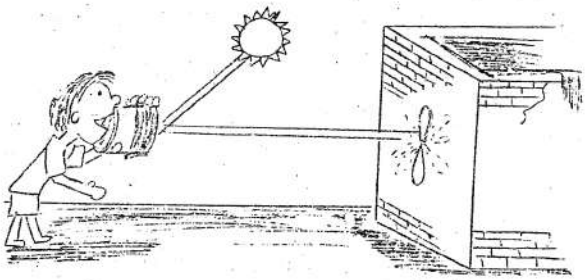
Open up a balloon and stretch it over the bottom of the tin. Tie the balloon to the tin so that the balloon is stretched taut across the tin.

Take a small broken piece of a mirror. Stick it on the balloon, in the centre. (Use Fevicol)

Stand outside and adjust the angle of the mirror piece, so that a ray of sunlight falls on it. This ray of light is reflected on to a wall as a small circle.

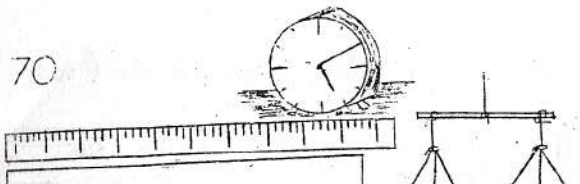
Now put your mouth into the open end of the tin and make different kinds of sounds into it; like — Ooooh! Aaah! Heeeeeyyy!!' etc.

You will see that, that small spot



of light on the wall will begin to dance and form different designs, according to the sound you make.

Observe carefully the different designs formed on the wall. Draw a few of them here.



MEASUREMENTS

Measuring distances

Cut out a circular disc from a cardboard or tin.

Fix it one end of a stick using a nail. This will now rotate like a wheel.

How will you this to measure distances?

Use this wheel and measure the length and breadth of your class, the distance from your home to your school etc.

Length of your classroom = _ _ _ _ _ _ _ _ _ _

Breadth of your classroom = _ _ _ _ _ _ _ _ _ _

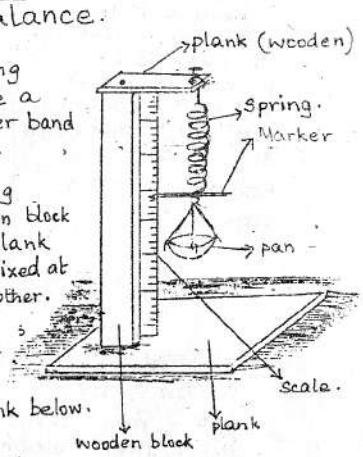
Distance from your house to the school = _ _ _ _ _ _ _ _ _ _

The Spring Balance.

To make a spring balance you may use a spring, or a long rubber band or an elastic band.

Fix a 30cm long reaper (wooden) or a thin block on to a plank. The plank and reaper must be fixed at right angles to each other.

On to the top end of the reaper fix a small plank parallel to the plank below. Suspend a spring from this plank on top.

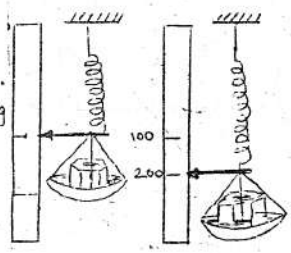


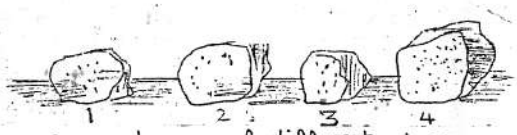
Fix a light, small stick on to the other end of the spring, to use as a marker.

Hang a plastic cup or a pan from the spring. Stick a long piece of paper on the vertical reaper. This will be required to graduate the weights measured.

Pans to put the weights may be made by the st using match-boxes, or plastic lids of bottles etc.

Keep a 100 gm measuring weight in the pan. Mark the point on the paper and write 100g on it. Similarly mark 200g 300g, 400 g and 500 gms on the paper.





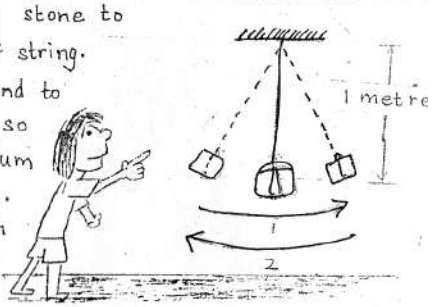
Take four stones of different sizes. Guess their weights and write them in the columns below.

Now weigh the stones on your spring balance. Then use an ordinary double pan balance and weigh the stones once more. Enter all your calculations in the tabular column below.

Object	guessed weight	weight on the spring balance	weight on the common balance
Stone 1	.....	.....	.....
Stone 2	.....	.....	.....
Stone 3	.....	.....	.....
Stone 4	.....	.....	.....

Measuring Time

Tie a heavy stone to a long piece of string. Tie the other end to a fixed place so that the pendulum oscillates freely. Adjust the length of the string, so that the length of the pendulum is 1 metre.



Count 1... 2... etc when the stone comes from one end to the other. Practice counting for a while.

Ask one of your classmates to go and touch any object (object must be a little distance away from the class). Now, count the number of oscillations the pendulum makes, during the time your friend goes upto the object and returns. In the same way ask some others to run and come back, and calculate the time each person takes. Who ran the fastest?

	Time taken		
Student ①	.....	Student ③	.....
student ②	.....	student ④	.....